

WHAT IS CLAIMED IS

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1. An ink-jet recording apparatus comprising:  
a containing member which contains a recording  
medium which has a base member and granular material  
coated on both sides of the base member, and roughness  
10 of the surfaces of the coated granular material is  
smaller than the roughness of the base member;  
a printing unit comprising an ink-jet  
recording head which jets recording liquid onto the  
recording medium;
- 15 a conveyance unit and a conveyance path for  
conveying the recording medium, one side of which has  
been already printed, into the printing unit again in  
order to print image onto the other side thereof; and  
a unit which enables the printing unit to  
20 print image on the recording medium such that the  
vertical orientations of the images printed both sides  
of the recording medium are coincide with each other.

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2. The ink-jet recording apparatus as claimed in claim 1, wherein both sides of the granular material is substantially symmetrically coated on the base member with respect to the center line of the base member.

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3. An ink-jet recording apparatus comprising:  
10 a first containing member containing a first recording medium;  
a second containing member which contains a second recording medium, and said second recording medium having a base member and a granular material  
15 coated on both surfaces of said base member, and the roughness of both surfaces of said coated granular material is smaller than the roughness of the base member, and both granular material is substantially symmetrically coated on the base member with respect to  
20 the center line of the base member;  
a printing unit comprising an ink-jet recording head which jets recording liquid onto the first recording medium or the second recording medium;  
a conveyance unit and a conveyance path for  
25 conveying the second recording medium, one side of which

has been already printed, into the printing unit again  
in order to print image onto the other side thereof; and  
a unit which enables the printing unit to  
print image on the other side of the second recording  
5 medium such that the vertical orientations of the images  
printed both sides of the recording medium are coincide  
with each other,  
wherein:  
the second containing member containing the  
10 second recording medium is distinguishable from the  
first containing member.

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4. The ink-jet recording apparatus as claimed  
in claim 1, wherein the recording medium is temporarily  
stopped in the conveyance path.

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5. The ink-jet recording apparatus as claimed  
in claim 1, wherein a heating unit is provided in the  
25 conveyance path.

6. The ink-jet recording apparatus as claimed in claim 1, further comprising a containing member which temporarily contains the recording medium on the conveyance path.

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7. The ink-jet recording apparatus as  
10 claimed in claim 1, wherein:  
the ink-jet recording head has a multi-nozzle-type ink-jet recording head which jets ink with a frequency substantially from 1 kHz through 40 kHz per nozzle on demand and configured so as to jets a  
15 plurality of colors of ink; and  
the recording medium is conveyed to a position that faces the nozzle surfaces of the multi-nozzle-type ink-jet recording head during recording.

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8. The ink-jet recording apparatus as claimed in claim 7, wherein:  
25 the nozzles of the ink-jet recording head are

arranged longitudinally so as to cover a printing width  
of the recording medium on which the image is to be  
printed, and said nozzles have a cross-sectional area in  
a range between 10  $\mu\text{m}^2$  and 600  $\mu\text{m}^2$ , and the ink-jet  
5 recording head has 1000 through 100000 nozzles in the  
nozzle arrangement density of 400 dpi through 3200 dpi.

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9. The ink-jet recording apparatus as claimed  
in claim 12, further comprising a recording medium  
heating unit having a heating range extending along the  
direction perpendicular to the recording medium  
15 conveyance direction so as to cover a range larger than  
the printing width of the recording medium.

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10. The ink-jet recording apparatus as  
claimed in claim 1, wherein:  
the unit which enables the printing unit to  
print image on the recording medium such that the  
25 vertical orientations of the images formed on both sides

of the recording medium are coincide with one each other comprises:

a rotation control mechanism which rotates the orientation of the recording medium by substantially 180  
5 degrees.

10                 11. The ink-jet recording apparatus as claimed in claim 1, wherein:

the unit which enables the printing unit to print image on the recording medium such that the vertical orientations of the images formed on both sides  
15 of the recording medium are coincide with each another has:

20                 a memory for storing image data that is used for printing image on the back side of the recording medium, front side of which has been already printed; and

the unit sends the image data to the ink-jet recording head in the reverse order so that the image data is printed on the back side of the recording medium from bottom to top direction.

12. The ink-jet recording apparatus as  
claimed in claim 1, wherein:

the unit, which enables the printing unit to  
print image on the recording medium such that the  
5 vertical orientations of the images formed both sides of  
the recording medium are coincide with each other,  
comprises:

a twisted path provided on the conveyance path,  
the shape of which is twisted so that the front and back  
10 sides of the recording medium, which passes through the  
twisted path, is turned upside down for substantially  
180 degrees.

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13. An ink-jet copier comprising:

a scanner which reads an original image placed  
on an original table, so as to form image data therefrom  
20 in sequence;

a printing unit which jets ink onto a  
recording surface of a recording medium based on the  
image data provided from the scanner; and

a recording medium conveyance unit disposed  
25 below the printing unit for conveying and ejecting the

recording medium in a predetermined timing according to the recording operation,

a containing member which contains a recording medium having a base member and granular material coated on both sides of the base member, and roughness of the 5 coated granular material is smaller than the roughness of the base member; and

10 a unit which enables the printing unit to print the images on the recording medium such that the vertical orientations of the images printed on both 15 sides of the recording medium are coincide with each other, wherein:

the printing unit has a multi-nozzle-type ink-jet recording head which jets ink with a frequency from 1 kHz through 40 kHz per nozzle on demand, and the ink-jet recording head is arranged so as to jet a plurality of colors of ink; and

20 the recording medium conveyance unit includes:  
a first conveyance unit that conveys the recording medium into a position that faces the nozzle surfaces of the multi-nozzle-type ink-jet recording head; and

25 a second conveyance unit and a conveyance path for conveying the recording medium, one side of which has been already printed, into the printing unit again

in order to printing image onto the other side thereof.

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14. The ink-jet copier as claimed in claim 13,

wherein:

the unit which enables the printing unit to  
print image on the recording medium such that the  
10 vertical orientations of the images formed both sides of  
the recording medium are coincide with each other  
comprises:

a rotation control mechanism which rotates the  
orientation of the recording medium by substantially 180  
15 degrees.

20 15. The ink-jet copier as claimed in claim 13,

wherein:

the nozzles of the ink-jet recording head are  
arranged longitudinally so as to cover a printing width  
of the recording medium, on which the image is to be  
25 printed, and

said nozzles have a cross-sectional area in a range between 10  $\mu\text{m}^2$  and 600  $\mu\text{m}^2$ ,  
    and the ink-jet recording head has 1000 through 100000 nozzles in the nozzle arrangement density  
5   of 400 dpi through 3200 dpi.

10                 16. The ink-jet copier as claimed in claim 15,  
    further comprising:

        a plurality of recording media; and  
        a plurality of containing members containing  
    the plurality of recording media,

15                 wherein:

        at least one of the plurality of recording media comprises a recording medium, both sides of the granular material is substantially symmetrically coated on the base member with respect to the center line of

20   the base member; and

        the containing member, which contains said recording medium, is distinguishable from the other containing members.

17. The ink-jet copier as claimed in claim 22,  
further comprising a recording medium heating unit that  
has a heating range extending along the direction  
perpendicular to the recording medium conveyance  
5 direction so as to cover a range larger than a printing  
width of the recording medium, on which the image is to  
be printed.

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18. A recording medium used in an ink-jet  
recording apparatus, which has a containing member which  
contains the recording medium; a conveyance path for  
15 conveying the recording medium; one side of which has  
been already printed, into a printing unit again in  
order to printing image onto the other side thereof; and  
a unit for printing image on the recording medium such  
that the vertical orientations of the images printed  
20 both sides of the recording medium are coincide with  
each other, comprising:

a base member;  
and granular material coated inside of the  
base member and also both sides of the base member, and  
25 roughness of the surfaces of the coated granular

material is smaller than the roughness of the base member.

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19. A recording medium used in an ink-jet copier that has: a scanner unit which reads an original image placed on an original table, so as to form image data therefrom in sequence; a recording unit having a multi-nozzle-type ink-jet recording head which jets ink with a frequency of 1kHz through 40 kHz per nozzle on demand, the ink-jet recording head is arranged so as to jet a plurality of colors of ink, said recording unit jetting ink onto a recording surface of the recording medium based on the image data provided from the scanner unit; a recording medium conveyance unit disposed below the printing unit for conveying and ejecting the recording medium in a predetermined timing according to the recording operation, said recording medium conveyance unit has a conveyance unit and conveyance path that convey the recording medium into a position that faces the nozzle surfaces of the multi-nozzle-type ink-jet recording head and convey the recording medium, one side of which has been already printed, into the

printing unit again in order to print image onto the other side thereof; and a unit which enables to print image on the recording medium such that the vertical orientations of the images printed on both sides of the recording medium are coincide with each other,  
5 comprising:

a base member; and  
                  granular material coated inside the base member and also both sides of the base member, and the  
10              roughness of the surfaces of the coated granular material is smaller than the roughness of the base member.

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20. The recording medium as claimed in claim 19, wherein both sides of the granular material is substantially symmetrically coated on the base member  
20 with respect to the center line of the base member.